Department of Community Health

Botulism

Information for the Public

What is botulism?
Botulism is a muscle-paralyzing disease caused by a nerve toxin, (botulinum toxin), which is made by the spores of a bacterium called *Clostridium botulinum*. This type of bacterium is commonly found in soil, but its spores only produce the nerve toxin in the absence of oxygen, such as in improperly canned food. Botulinum toxin can be colorless, odorless, and tasteless when put in a liquid solution.

There are seven types of botulinum toxin, but only four of these are known to cause illness in humans. The botulinum toxins are some of the most lethal, naturally occurring substances known to man and can lead to death if not treated.

The toxins have some specialized medicinal and cosmetic uses (such as Botox®).

How can people become exposed to botulinum toxin?
There are three main forms of naturally occurring botulism:

- **Foodborne botulism** occurs when a person ingests botulinum toxins from food products. This by far is the most common cause of botulism.
- **Infant botulism** occurs in susceptible infants who have *C. botulinum* in their intestinal tract that produces the toxin.
- **Wound botulism** occurs when spores of *C. botulinum* get into an open wound and produce botulinum toxins. This type of botulism is very rare, but is being seen with more frequency among intravenous (injection) drug users.

There are an average of 110 cases of botulism reported per year in the United States, most of which are infant botulism. Outbreaks of foodborne botulism involving two or more persons are usually caused by eating contaminated home-canned foods. Skin contact with botulinum toxins will not lead to botulism since the toxins do not readily pass through intact skin. Botulism is **not** spread from one person to another.

Could botulinum toxins be used as a weapon?
A fourth type of botulism can result from the intentional processing of botulinum toxins into a liquid form. Exposure to these toxins is called inhalation botulism, which results from breathing in an aerosol of the liquid form of botulinum toxin. An intentional release of botulinum toxin could involve inhalation (breathing) of aerosolized toxin or eating contaminated food. An attack involving contamination of public drinking water is unlikely as botulinum toxins are inactivated by chlorinated water (most public drinking water is treated with chlorine to remove bacteria).

Botulinum toxins have been specifically developed as a weapon by at least five nations. There have been prior attempts to use an aerosol botulinum weapon by the Japanese cult Aum Shinrikyo, although these attempts failed. The only known example of human inhalational botulism occurred when three German laboratory scientists were accidentally exposed during an animal experiment.

How can the botulinum toxins/botulism affect my health?
The degree of reaction when exposed to botulinum toxins depends on three main factors: the amount one is exposed to, the route of exposure (breathing, eating, etc.), and the length of time of the exposure. Generally, the smaller the dose received, the longer it takes for symptoms to appear.

- **Foodborne Botulism:** The classic signs and symptoms of foodborne botulism generally start a few hours to one to two days after eating contaminated food. Symptoms include double and/or blurred vision, drooping eyelids, slurred and/or disturbed speech, difficulty swallowing solid food, dry mouth, and muscle weakness. Infants with botulism appear lethargic, feed poorly, are constipated, have a weak cry, and poor muscle tone. These are all symptoms of the muscle paralysis caused by the bacterial toxin. If left untreated, these symptoms may progress to cause paralysis of the arms, legs, trunk, and respiratory muscles and, eventually, death from respiratory failure.

- **Inhalation Botulism:** There is much less information available on signs and symptoms following inhalation of botulinum toxins. However, there are some prior human and animal examples of inhalation exposure to draw from. Generally, the onset of symptoms may begin within one to three days following exposure. Symptoms are similar to foodborne botulism with difficulty swallowing, dizziness, mild to severe muscle weakness (especially in the neck), excessive mucus in the nose and throat, mouth breathing, and the feeling of having a cold but generally without the fever appearing first. Severe generalized weakness, difficulty moving the eyes, slurred and/or disturbed speech can appear later. Animals exposed to a botulinum aerosol died in 2-4 days, with signs and symptoms of poisoning occurring 12-18 hours before death.

A patient with severe botulism may require a breathing machine as well as intensive medical and nursing care for weeks to months following exposure. Patients who survive botulism may have fatigue and shortness of breath for years afterwards and long-term therapy may be needed to aid recovery.

How is botulism diagnosed?
Physicians may consider the diagnosis if the patient's history and physical examination suggest botulism. However, these clues are usually not enough and, as a result, botulism can be easily misdiagnosed. The diagnosis of botulism is confirmed by identifying botulinum toxins in serum (blood), stool, stomach liquid, vomit, suspected food and/or drink or wound tissue. This method can take up to four days, however, and results can be confused by a number of factors, including types of medications a patient is taking.

How is botulism treated?
Good supportive care in a hospital is the mainstay of therapy for all forms of botulism. The respiratory failure and paralysis that occurs with severe botulism may require a patient to be on a breathing machine (ventilator) for weeks, plus intensive medical and nursing care. Most patients eventually recover after weeks to months of care.

Treatment with a specific anti-toxin can also help destroy any botulinum toxins circulating in the blood. This antitoxin is effective in reducing the severity of symptoms only if it is administered early in the course of the disease. At this time, botulinum antitoxin is only available to healthcare providers for treatment of cases of botulism.

How can I minimize and/or prevent exposure to botulinum toxins?
Foodborne botulism is usually caused by eating home-canned foods with low acid content, such as asparagus, green beans, beets and corn. However, outbreaks of botulism can result from more unusual sources such as chopped garlic in oil, chili peppers, tomatoes, improperly handled baked potatoes wrapped in aluminum foil, and home-canned or fermented fish. Furthermore, since honey can contain spores of *C. botulinum* and has been a source of infection for infants, children less than 12 months old should not be fed honey.

People who do home canning should follow strict hygienic procedures to reduce contamination of foods. Persons who eat home-canned foods should consider boiling or heating the food and/or drink **before** consuming it to ensure safety. Botulinum toxins are destroyed if heated to 240-250 degrees Fahrenheit for 20 or more minutes. For more information, consult the US Department of Agriculture (USDA) Complete Guide to Home Canning, found at http://foodsafety.cas.psu.edu/canningguide.html.

Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not sharing hypodermic needles.

What should I do if I am exposed to botulinum toxins?
If someone is showing symptoms of botulism, they should seek medical treatment immediately. Botulism can be fatal and is considered a medical emergency.

In the *extremely* unlikely event that you think you have been exposed to an aerosol containing botulinum toxins, you can protect yourself by immediately and thoroughly washing clothing and skin with soap and water. Objects and/or surfaces contaminated by a botulinum aerosol can be washed with household bleach for 10 minutes to destroy remaining toxins. Seek medical care as soon as possible as signs and symptoms of may not show up for a few days and careful medical monitoring may be required.

Report suspected cases of botulism or suspected intentional release of botulinum toxin to your local health department and/or local law enforcement agency.

Where can I get more information on botulism?

- Contact your local public health department. Check http://www.malph.org/page.cfm/108/ for your jurisdiction. A list of local public health departments is also available at http://www.michigan.gov/documents/June2003LHDList_69658_7.pdf
- Call the Michigan Department of Community Health Toxics and Health Hotline (1-800-648-6942)
- Visit the Michigan Department of Community Health Office of Public Health Preparedness website http://www.michigan.gov/ophp
- The Agency for Toxic Substances and Disease Registry (1-888-422-8737)
- Visit the Centers for Disease Control and Prevention (CDC) "Emergency Preparedness & Response" web site at http://www.bt.cdc.gov/agent/botulism/index.asp
- Call the Centers for Disease Control and Prevention Public Response Service Hotline:
  English: 1-888-246-2675
  Español: 1-888-246-2857
  TTY: 1-866-874-2646

For immediate assistance, call the Poison Control Center hotline: 1-800-222-1222